REMARKS

In the Office Action, the Examiner rejected claims 1, 7, 11 and 17 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,777,364 issued to Sartore, claims 3-5, 6, 10-15 and 17-18 under 35 U.S.C. § 103(a) as being unpatentable over Sartore and in view of U.S. Patent No. 4,885,465 issued to Nagatsuka et al., and claims 7-9, 16, and 19-30 as being unpatentable over Nagatsuka et al. in further view of U.S. Patent No. 5,594,246 issued to Sudo et al. The rejections are fully traversed below. Reconsideration of the application is respectfully requested based on the following remarks.

Claims 1 and 11 have been amended to further clarify the subject matter regarded as the invention. Claims 5, 10, 19, and 20 have been canceled. New claims 31-34 have been added. Claims 1-4, 6-9, 11-18, and 21-34 are now pending in this application.

PATENTABILITY OF CLAIMS

The rejections of claims 1, 7, 11, and 17 under 35 U.S.C. § 102(b) will not be addressed since claims 1 and 11 have been amended to include additional limitations.

Independent claims 1 and 11 of the present invention recite a first and a second wavelength dispersive X-ray detector wherein each detector detects X-rays about a different characteristic emission level. The Office action states that it is not inventive to include a second wavelength dispersive detector since such a modification amounts to a mere duplication of parts. However, as stated in the Office Action, Nagatsuka does not teach the use of two detectors in which both are wavelength dispersive detectors. The Undersigned takes the lack of this teaching in both Satore and Nagatsuka et al. as evidence that it is not obvious to use two wavelength dispersive X-ray detectors in a single inspection system.

Since both Satore and Nagatsuka et al., alone or in any combination, do not teach or suggest a first and a second wavelength dispersive X-ray detector for detecting X-rays about two different characteristic emission levels, it is submitted that claims 1 and 11 are patentably distinct from the cited references.

It is submitted that dependent claims 2-4, 6-9, 12-14 and 16-18 are also patentably distinct from Satore and Nagatsuka et al. for at least the same reasons as those recited above for their corresponding independent claims. These dependent claims further recite additional limitations that further distinguish these dependent claims from the cited references. Thus, it is

respectfully requested that the Examiner withdraw the rejection of claims 1-4, 6-9, 11-14, and 16-18 under 35 U.S.C §103(a).

Independent claims 21 and 26 pertain to an iterative and predictive algorithm useful for determining film stack characteristic values. Specifically, claims 21 and 26 involve comparing raw data and predicted data. The Office Action states that col. 3, lines 32-61 of Nagatsuka et al. teaches the comparison of measured and collected spectra to determine the composition of a sample. However, it is respectfully submitted that the cited section of Nagatsuka et al. describes a technique for simultaneously displaying energy spectrum and wavelength spectra on a CRT. *See* col. 3, lines 34-36. It is respectfully submitted that the description within the cited section does not relate to comparing predicted and raw data. Since Nagatsuka et al. and Sudo et al., alone or in combination, do not teach or suggest each of the operations of claims 21 and 26, it is submitted that claims 21 and 26 are patentably distinct from the cited references.

It is submitted that dependent claims 22-25 and 27-30 are also patentably distinct from Nagatsuka et al. and Sudo et al. for at least the same reasons as those recited above for their corresponding independent claims. These dependent claims further recite additional limitations that further distinguish these dependent claims from the cited references. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 21-30 under 35 U.S.C §103(a).

SUMMARY

It is respectfully submitted that all pending claims are allowable and that this case is now in condition for allowance. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

If any fees are due in connection with the filing of this Amendment, the Commissioner is authorized to deduct such fees from the undersigned's Deposit Account No. 50-0388 (Order No. KLA1P012).

Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

The paragraph beginning on page 1 line 22 and ending on page 2 line 9 was amended as follows:

A critical aspect of semiconductor fabrication involves the formation of the multiple conductive layers and liner layers. Each conductive layer includes the metal traces which form the paths along which electronic signals travel within semiconductor devices. Each of the conductive layers, are separated by a dielectric material layer and a liner layer. The dielectric material layer, commonly silicon dioxide, provides electrical insulation between the conductive layers. Portions of each conductive layer are connected to portions of other conductive layers by electrical pathways called "plugs." The liner layers are formed between each conductive layer and each dielectric material layer to prevent the conductive material from diffusing into the dielectric material layer. The liner layer inhibits a conductive layer from diffusing into an underlying dielectric and short[ing] circuiting with an adjacent conductive layer. Of course, such short circuit formations are likely to be detrimental to semiconductor performance. In particular note, copper, a common conductive material used in semiconductor devices, diffuses very aggressively into silicon dioxide. The thickness and composition of the conductive and liner layers must be formed under extremely small margins of error. Thus, systems capable of testing the characteristics of these layers are very important.

IN THE CLAIMS

*1. (Once Amended) An apparatus for measuring film stack characteristics of a sample, the apparatus comprising:

a beam generator configurable to direct a charged particle beam towards the sample such that the charged particle beam penetrates at least two layers of the film stack, the charged particle beam causing X-rays to emanate from the sample; and

a first **and a second wavelength dispersive** X-ray detector positioned above the sample **wherein each detector detects X-rays about a different characteristic emission level [so as to detect at least a portion], wherein [of]** the X-rays **[emanating] emanate** from the sample.

*11. (Once Amended) A method for measuring at least one characteristic of a film stack on a sample, the method comprising:

directing a charged particle beam towards the sample such that the charged particle beam penetrates at least two layers of the film stack, the charged particle beam causing X-rays to emanate from the sample; and

detecting at least a portion of the X-rays emanating from the sample **about two different characteristic emission levels** using a first **and a second wavelength dispersive** X-ray detector which **[is] are** positioned above the sample.